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17. ABSTRACT (MAX. 250 WORDS) An experiment was designed to test the hypothesis that proper use of electro-mechanical aids can relieve the teacher of a great deal of the routine work of teaching foreign languages. He would thus be allowed to extend himself either quantitatively or qualitatively in his work. This experiment uses the qualitative approach. Three groups of students in college German classes were used during two semesters.

The experiment during the Fall semester of 1960 was concerned with the introduction of new vocabulary material. One group treated this material only in class, with conventional homework. The second group treated this material exclusively through the use of electro-mechanical equipment. The class time freed thereby was used for extensive conversational work on specially devised materials. The control groups followed the usual class-laboratory procedures in use at the university. During the Spring semester, all drill material on verb forms and word order was subjected to the above-described experimental treatments.

Achievement levels were determined via the Carrol-Sapon, Modern Language Aptitude Test, the College Board Placement Tests in German Reading and German Comprehension. Materials used in the experiment consisted of the textbook, Deutsch Eins: A Totally Integrated Laboratory-Class Approach, by E.N. Lewis.

Analysis of the data by the F-test showed no significant differences in achievement of the experiment and control groups. (All raw data is presented).

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Lang Research

EXPERIMENTATION IN THE DEVELOPMENT OF MORE EFFECTIVE METHODS OF TEACHING FOREIGN LANGUAGES BY MAKING EXTENSIVE USE OF ELECTRO-MECHANICAL AIDS

The research reported herein was performed pursuant to a contract with the United States Office of Education, Department of Health, Education, and Welfare.

Contract: SAE-8715

Dates (inclusive): April 19, 1960 - June 30, 1961

Principal Investigator
Earl N. Lewis

Louisiana State University
Baton Rouge

July, 1961

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INTRODUCTION

The Problem

It is generally accepted that electro-mechanical aids, whether installed as a foreign language laboratory or used elsewhere, can improve foreign language learning by increasing the student's contact with the new language. It is not a matter of general agreement that the use of these devices can decrease the total task of the teacher.

It is hypothesized in this experiment that proper use of electro-mechanical aids can relieve the teacher of a great deal of the routine work of teaching, and allow the teacher to extend himself either quantitatively by increasing the number of students taught, or qualitatively by doing more for the original number of students. The basic problem in either case is to demonstrate under what conditions a given part of the total teaching-learning process can be accomplished by the student using electro-mechanical aids, and without the presence of a teacher. This experiment seeks to determine whether it is possible, by making extensive use of electro-mechanical equipment, for the teacher to extend himself qualitatively, i.e. to use the class time thereby freed for more extensive engagement of the student in "performance in circumstances which parallel the normal use of the language in the target culture." It is precisely in this activity, by which is meant the closest possible approximation to the dyadic process which is normal human speech, that the live teacher may be presumed to be indispensable.

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Objectives

Two experiments were conducted in the teaching of Elementary German involving integrated class and laboratory procedures so devised as to permit the instructor to extend himself qualitatively. The class time freed by delegation of certain parts of the teaching-learning process to electro-mechanical equipment was used by the teacher to engage the students in normal speech activities as delimited above. A comparison of the achievement of experimental and control groups was made by analysis of covariance methods.

Supervision of the Project

The experiments were performed under the supervision of Earl N. Lewis, Principal Investigator, in consultation with the specialist in testing and statistical analysis, Donald E. Shipp, both of Louisiana State University. Other personnel involved were a native Ph.D. linguist, who aided with the revision of the materials, and native voices who re-recorded the revised material.

PROCEDURES

Design of the Experiments

The experiments were of simple-randomized design making use of analysis of covariance to compare the achievement of three groups of first semester German students. One experiment was run during the Fall semester of 1960, and the other during the Spring semester of 1961. During each semester the groups were labeled E^1, E^2, and C.

There were five sections of first-semester German students in the Fall of 1960. One section was selected to be experimental Group E^1, another section for experimental Group E^2, while the remaining three sections were used as the control Group C. In the Spring semester of 1961, there were four sections of beginning German students. Again one was selected to be experimental Group E^1, one to be experimental Group E^2, with the remaining two sections serving as the control Group C.

The experiment during the Fall semester of 1960 was concerned with the introduction of new vocabulary material. Group E^1 treated this material only in class, with conventional non-audio-lingual homework. Group E^2 treated this material exclusively through the use of electro-mechanical equipment. The class time freed thereby was used for extensive conversational work on specially devised materials. The control groups followed the usual class-laboratory procedures in use at the university. During the Spring semester of 1961, all drill material on verb forms and word order was subjected to the above-described experimental treatments.

At the beginning of both semesters the Carrol-Sapon, Modern Language Aptitude Test was administered to all sections. At the end of both semesters all sections were given the College Board Placement Tests in German Reading, Form BPL2 and German Listening Comprehension, Form DLC2. By making use of analysis of covariance, the F-test of significance was made to determine if significant differences in achievement among the Groups E^1, E^2, and C existed as measured by the German Reading and the German Listening Comprehension Tests. This F-test of significance was made on the groups for the Fall semester and the Spring semester. The analysis of covariance procedures allowed statistical matching of the groups on language aptitude as measured by the Modern Foreign Language Aptitude Test given at the beginning of each semester.

Classes were accepted in these experiments as the students registered. It will be assumed that the distribution of students among experimental and control groups was random.

Data Collected From the Experiments

Scores made by Groups E^1, E^2, and C on the Modern Language Aptitude Test, the German Reading Test, and the German Listening Comprehension Test during the Fall of 1960 are presented in Table I. Scores made by Groups E^1, E^2, and C during the Spring semester of 1961 follow in Table II.

TABLE I

SCORES MADE BY GROUP E[1], FALL SEMESTER, 1960

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
1	147	124	383
2	92	122	391
3	92	114	377
4	122	131	433
5	134	119	394
6	94	112	380
7	130	129	397
8	167	110	399
9	119	128	433
10	100	119	402
11	132	108	414
12	58	122	374
13	137	121	414
14	87	119	377
15	79	129	326
16	128	122	447
17	138	129	388
18	157	121	402
19	144	115	408
20	161	126	399

TABLE I (continued)

SCORES MADE BY GROUP E^2, FALL SEMESTER, 1960

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
1	138	145	473
2	142	128	425
3	146	152	464
4	161	126	459
5	136	156	470
6	108	112	360
7	150	119	456
8	93	137	346
9	108	124	405
10	85	122	405
11	143	112	405
12	145	122	425
13	117	115	380
14	151	115	383
15	159	137	459
16	103	110	414
17	140	128	399
18	73	115	363
19	88	117	357
20	125	122	394
21	147	119	394
22	130	124	416
23	88	129	433
24	150	128	411
25	146	110	425
26	94	105	343

TABLE I (continued)

SCORES MADE BY GROUP C, FALL SEMESTER, 1960

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
Class C[1]			
1	108	117	399
2	122	133	422
3	97	124	402
4	128	129	433
5	149	142	509
6	114	126	414
7	120	151	416
8	100	112	402
9	155	129	453
10	109	108	419
11	127	119	416
12	138	126	402
13	137	126	433
14	103	122	388
15	111	124	388
16	127	119	419

TABLE I (continued)

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
Class C[2]			
1	92	128	394
2	83	114	354
3	68	117	397
4	92	112	377
5	91	119	340
6	125	122	394
7	93	119	354
8	112	110	377
9	100	110	380
10	110	137	399
11	96	131	351
12	122	119	425
13	83	112	371
14	146	103	357
15	74	117	377
16	140	131	402
17	76	122	348
18	101	124	366

TABLE I (continued)

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
Class C[3]			
1	162	126	405
2	146	126	383
3	80	119	357
4	92	119	366
5	83	108	383
6	140	122	394
7	120	112	380
8	136	137	478
9	119	119	475
10	81	124	416
11	93	112	366
12	136	119	430
13	132	133	399
14	146	124	383
15	146	131	467
16	128	112	428
17	137	129	464
18	121	119	366

TABLE II

SCORES MADE BY GROUP E', SPRING SEMESTER, 1961

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
1	124	112	366
2	137	126	397
3	108	126	425
4	97	115	414
5	87	126	411
6	146	115	397
7	134	121	371
8	110	121	363
9	116	140	453
10	140	129	459
11	78	122	394
12	122	119	408
13	115	108	394
14	120	137	369
15	166	129	453
16	84	121	433
17	94	133	402
18	99	110	366

TABLE II (continued)

SCORES MADE BY GROUP E^2, SPRING SEMESTER, 1961

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
1	108	121	394
2	110	147	411
3	105	119	411
4	144	128	473
5	109	115	442
6	109	126	425
7	116	115	388
8	103	115	348
9	109	119	408
10	144	129	428
11	148	124	439
12	107	121	397
13	115	121	377
14	119	117	433
15	82	122	377
16	135	110	433
17	134	115	397

TABLE II (continued)

SCORES MADE BY GROUP C, SPRING SEMESTER, 1961

Pupil Number	MLAT	German Listening Form DLC2	German Reading Form BPL2
Class C[1]			
1	135	140	478
2	156	135	416
3	137	115	436
4	132	122	397
5	104	124	419
6	108	115	419
7	157	131	464
8	97	122	475
9	108	128	416
10	105	135	436
11	138	117	388
12	171	140	450
Class C[2]			
1	131	160	467
2	84	124	411
3	144	133	436
4	102	129	447
5	123	126	433
6	122	117	425
7	136	124	414
8	141	115	351
9	133	142	425
10	135	126	419
11	156	128	450
12	122	119	430
13	163	135	490

Work Schedule and Materials Used

The materials used for the experiments consisted entirely of the textbook, Deutsch Eins: A Totally Integrated Laboratory-Class Approach by E. N. Lewis. This book has been in use at Louisiana State University in mimeographed form since 1957. It was revised and re-recorded prior to the commencement of the experiments. Each of its ten lessons, programmed primarily on a step-increment basis, is divided into three parts: vocabulary building, pattern practice (exercises), and conversation. Most of the lessons also have reading selections. With each lesson is a suggested schedule for each class period which includes the name of the recording and its playing time for each part of each lesson.

Because the textbook requires extensive use of integrated recordings in the language laboratory by the students from the very outset, the experiments merely added or subtracted some of this practice material to or from class time respectively. There is a total of about 22.5 hours of recordings integrated with the textbook. Since each student must use each recording at least three times, a minimum of about 67.5 hours of laboratory practice is expected of each student during the semester. In addition, there is a pronunciation recording and an irregular verb recording which must be mastered during the semester.

The experiment for the first semester involved about 220 minutes of laboratory drill on vocabulary items for the lessons which were added to the class time for Group E^1 and to the laboratory practice time for E^2. The experiment for the second semester involved about 320 minutes of integrated laboratory drill on the exercises for the lessons. The diverted time in each case was spent in added drill in class for Group E^1 and in conversational situations in class for Group E^2. Group C followed the schedule suggested in the textbook.

No new materials or equipment were developed as a result of this experiment.

Analysis of Data

Analysis of covariance data and F-test results for the Fall and Spring experiments are presented in Tables III and IV. The F-test provides a test of the hypothesis that no significant differences exist among the adjusted means of E^1, E^2, and C on the German Listening Comprehension and German Reading Tests. Differences among the adjusted means of the experimental and control groups were not significant for either the Fall or Spring semester.

TABLE III

F-TESTS ON DIFFERENCES IN MEANS

FALL SEMESTER, 1960

Source of Variation	Degrees of Freedom	Adjusted Sum of Squares	Adjusted Mean Squares
DLC2			
Between groups	2	316.0	158.0
Within groups	94	23,195.9	246.8
F = 158.0/246.8 = .64 (not significant)			
BPL2			
Between groups	2	4,179.8	2,089.9
Within groups	94	238,522.6	2,537.5
F = 2089.9/2537.5 = .82 (not significant)			

TABLE IV

F-TESTS ON DIFFERENCES IN MEANS

SPRING SEMESTER, 1961

Source of Variation	Degrees of Freedom	Adjusted Sum of Squares	Adjusted Mean Squares
DLC2			
Between groups	2	347.4	173.7
Within groups	56	4,936.2	88.1
F = 173.7/88.1 = 1.97 (not significant)			
BPL2			
Between groups	2	5,215.5	2,607.8
Within groups	56	49,262.0	879.7
F = 2607.8/879.7 = 2.96 (not significant)			

For the Fall semester, the ratio of the between groups adjusted mean square to the within groups adjusted mean square is less than one for both the German Listening Test and the German Reading Test. Therefore, F is not significant. In the Spring semester, the F-ratios are greater than one but do not reach the five per cent level of significance which is 3.16. In neither experiment may differences be considered significant.

Means for Groups E^1, E^2, and C on the Modern Language Aptitude Test, the German Listening Comprehension and German Reading Tests are presented in Table V. Included are means of these groups for both the Fall and Spring experiments. Adjusted means for these groups may be found in Table VI. The adjusted means were found by analysis of covariance procedures and statistically matches the three groups on initial aptitude in foreign languages as shown by the Modern Language Aptitude Test. The adjustments were small becuase of the low correlation of the MLAT scores with those found on the two final tests.

TABLE V

MEANS OF EXPERIMENTAL AND CONTROL GROUPS

	Group E^1	Group E^2	Group C
Fall Semester, 1960			
Number of Students	20	26	52
MLAT Means	120.9	125.6	114.4
Listening Test Means	121.0	124.2	122.0
Reading Test Means	396.9	410.2	402.3
Spring Semester, 1961			
Number of Students	18	17	25
MLAT Means	115.4	117.5	129.6
Listening Test Means	122.8	121.4	128.1
Reading Test Means	404.2	410.6	431.7

TABLE VI

ADJUSTED MEANS

	Group E^1	Group E^2	Group C
Fall Semester, 1960			
Listening Test Means	120.8	123.5	122.5
Reading Test Means	395.2	406.1	405.5
Spring Semester, 1961			
Listening Test Means	123.8	121.7	127.5
Reading Test Means	406.7	412.3	428.7

Since differences in achievement among the experimental and control groups were not significant, further analysis of data seems unnecessary. Because of extremely low scores by some students in all groups, the tables converting raw scores to standard scores had to be extended downward for both the listening and reading tests. These tests were obviously designed for more advanced German students, and were not designed to measure achievement in first-semester German.

CONCLUSIONS

The project progressed as planned, with the original objectives being accomplished. Differences in achievement of experimental and control groups were not significant in this study. However, it is realized that not all the experiences gained by students who spent more time on normal speech activities were measured by the tests used in these experiments.

The chief problem associated with these experiments and remaining unsolved is that of how much more significant the results would have been if the reading selections instead of the exercises had been conventionalized.

SUMMARY STATEMENT OF EXPENDITURES

Salaries and wages	$5,780.04
Employee benefits	289.00
Supplies and expenses	956.95
Indirect costs	$1,053.90
TOTAL EXPENDITURES	$8,079.89